

Patient Blood Management: The South African story

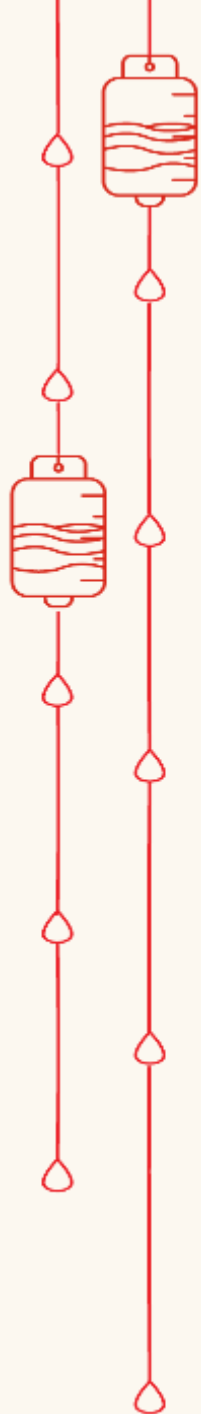
GPEXPO

March 2024

Dr Petro-Lize Wessels

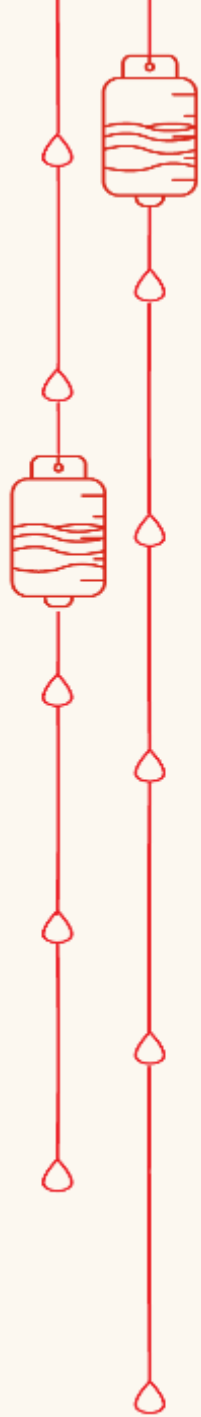
Lead Consultant PBM and Transfusion Medicine





Overview

- What is PBM?
- Why do we need PBM?
- Factors impacting on healthcare in South Africa.
- Areas of concern in South Africa – from a blood service perspective
- What happened since 2017 in South Africa – and now Sub-Saharan Africa?
- Can we see an impact of all that has happened?
- Conclusion



What is PBM?

Sixty-third World Health Assembly

Date: 17–21 May 2010

Location: Geneva, Switzerland

The Sixty-third session of the World Health Assembly took place in Geneva during 17–21 May 2010. At this session, the Health Assembly discussed a number of public health issues, including:

**WHA63.12 adopted
by resolution May 21, 2010:**

*„Bearing in mind that **patient blood management means that before surgery every reasonable measure should be taken to optimize the patient’s own blood volume, to minimize the patient’s blood loss and to harness and optimize the patient-specific physiological tolerance of anaemia following WHO’s guide for optimal clinical use (three pillars of patient blood management)**“*





Definition of PBM

Society for the Advancement of Blood Management (SABM):

“PBM is the **timely** application of **evidence-based medical and surgical concepts** designed to





- **maintain hemoglobin** concentration,
- **optimize hemostasis** and
- **minimize blood loss,**

in an effort to **improve patient outcomes.**”

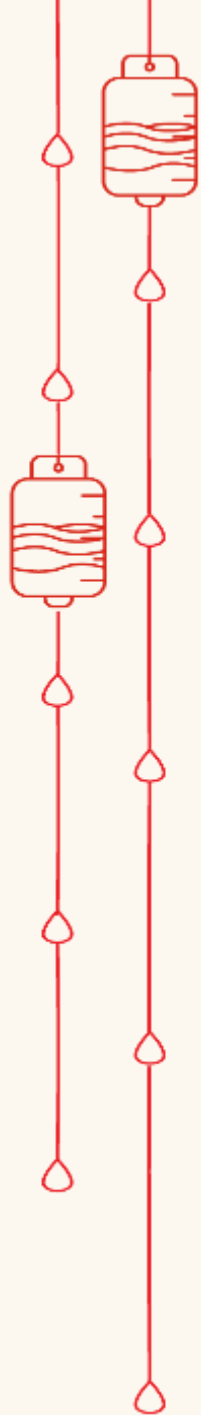




Core focus points of PBM

- Timely optimization of the patient's own red cell mass – **diagnosis and treatment of anaemia.**  Pillar 1
- Control / **minimize blood loss** and bleeding.  Pillar 2
- Optimize and harness the **patient's physiological reserve** / tolerance to anaemia.  Pillar 3
- **Patient empowerment** and - participation in the decision-making process.  Informed Consent
- **Multi-disciplinary** approach.





Why do we need PBM?

Why do we need PBM?



2019:

1,2 Billion IDA
Even more
with ID alone

ASH PUBLICATIONS

AMERICAN SOCIETY OF HEMATOLOGY
blood



**Anaemia: A common,
silent enemy**

PBM measures

screen for, diagnose and
optimally treat iron
deficiency and anaemia in
ALL patients.

Babies / Toddlers:

- Babies born to IDA mothers have low ferritin
- 25% have IDA – not without anaemia.

Teenagers:

- Learning/speech difficulties
- Behavioural / social issues

Young adults:

- Did not complete high school or tertiary education.
- Not holding down jobs
- Emotional health issues
- Social integration issues

**Iron deficiency is a
public health issue**

Functional Significance of Early-Life Iron Deficiency: Outcomes at 25 Years

pediatrics.com • THE JOURNAL OF PEDIATRICS

Functional Significance of Early-Life Iron Deficiency: Outcomes at 25 Years

Betsy Lozoff, MD^{1,2}, Julia B. Smith, EdD³, Niko Kaciroti, PhD¹, Katy M. Clark, MA¹, Silvia Guevara, MD⁴,
and Elias Jimenez, MD⁴

Anaemia: A common, silent enemy 2

~ 43%


Prevalence of anaemia in pregnancy in a regional health facility in South Africa

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SAMJ RESE

Preoperative anaemia and clinical outcomes in the South African Surgical Outcomes Study

D Marsicano,¹ BComm, MB ChB, DA (SA); N Hauser,^{2,3} BSc (Physio), MB ChB, DA (SA), FCA (SA), MMed, FANZCA; F Roodt,² MB ChB, FCA (SA); E Cloete,⁴ MB ChB, DA (SA), FCA (SA); W Conradie,⁵ MB ChB, FCS (SA), MMed (Surg); V Morford,⁶ MB BCh, DA (SA), FCA (SA); D Nel,⁷ MB ChB, DA (SA), FCA (SA); D G Bishop,⁸ MB ChB, FCA (SA); T E Madiba,⁹ PhD; B M Biccard,¹ PhD; on behalf of the South African Surgical Outcomes Study investigators



PBM measures

- Screen, diagnose and treat anaemia in ALL patient groups.
- Correct pre-op anaemia
- Do not treat pre-op anaemia with red cell transfusions.

- **Pre-operative anaemia was present in ~ 48% of all elective surgical patients.**

- Pre-operative anaemia was independently associated with:

-In hospital mortality (OR 1.66, CI 95%, p = 0.028)

-Admission to critical care (OR 1.49, CI 95%, p = 0.015)

- Multitude of international publications showing negative effects of pre-operative anaemia:
- Mortality, Morbidity
- Length of hospital stay
- Exposure to transfusions
- **One KEY recommendation in all:**



Mitigating transfusion risks



- ~ 35 000 papers: Outcomes of allogeneic transfusions.

Findings: **Dose-dependant** negative outcomes to transfusions:

- Mortality,
- Morbidity – Infections, Thrombosis, ICU admissions, LOS, Transfusion adverse events.

Improved outcomes and reduced costs associated with a health-system-wide patient blood management program: a retrospective observational study in four major adult tertiary-care hospitals

Michael F. Leahy,^{1,2,3} Axel Hofmann,^{4,5,6} Sim
Sally A. Burrows,¹ Stuart G. Swain,⁸ Jeffrey H
Audrey Koay,¹¹ Gary C. Geelhoed,^{11,13} a

- **6 year,**
- **> 640 000 patients**
- **4 adult, tertiary level hospitals**

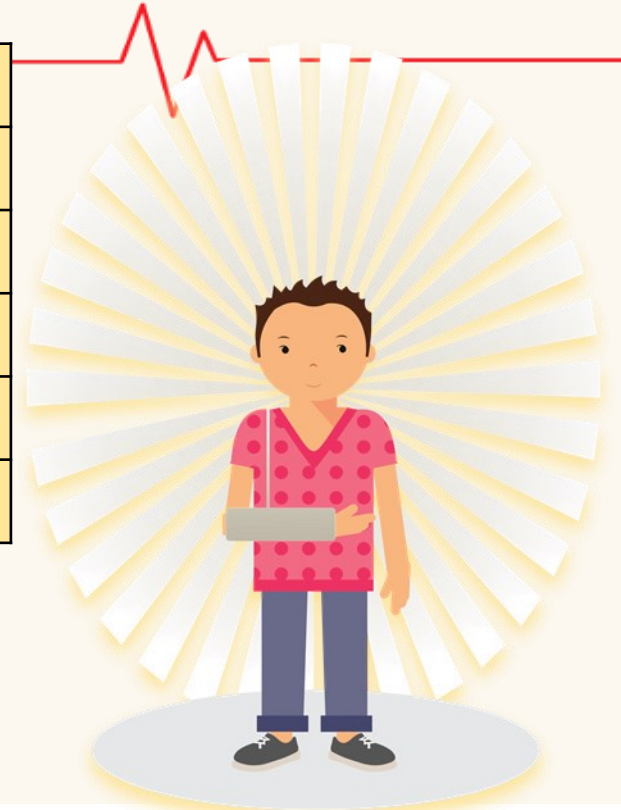
Indicator	Year 6-value
In-hospital mortality	28% reduction
Length hospital stay	15% reduction
Infection	21% reduction
AMI/Stroke	31% reduction
Readmission	6% increase

Evaluated 17 studies – 235 779 surgical patients
> 100 000 was a pre-PBM group
> 134 000 was the PBM group

Implementation of PBM:

- ↓ **Transfusion rates** by 39%
- ↓ **Red blood cell units** per patient by 0.43
- ↓ **LOS** (mean difference from 0.45 to 0.25)
- ↓ Total number of **complications** (RR 0.80, CI 95%, p,0.00001)
- ↓ **Mortality rate** (RR 0.89, CI 95%, p = 0.02)

Optimize patient outcomes



Multimodal Patient Blood Management Program Based on a Three-pillar Strategy

A Systematic Review and Meta-analysis

Althoff, Friederike C.*; Neb, Holger, MD*; Herrmann, Eva, PhD†; Trentino, Kevin M.‡; Vernich, Lee§; Füllenbach, Christoph, PhD*; Freedman, John, MD¶; Waters, Jonathan H., MD||; Farmer, Shannon, MD**;††; Leahy, Michael F., MD‡‡; Zacharywski, Kai, MD, PhD*; Meybohm, Patrick, MD*; Choorapoikayil, Suma, PhD*

Annals of Surgery: May 2019 - Volume 269 - Issue 5 - p 794–804
doi: 10.1097/SLA.0000000000003095

PERIPHERIES

Cost-effective healthcare

Product acquisition cost saving
= 18.5 million Australian \$



“Blood bill”

Associated costs:

- Transport
- Logistics
- Staffing (and time)
- Equipment

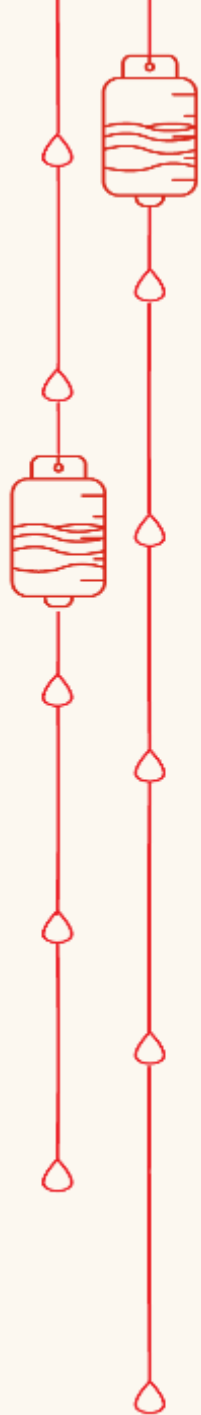
Indirect costs due to:

- Adverse events
- Longer hospital stay

Costs to the patient.

Improved outcomes and reduced costs associated with a health-system-wide patient blood management program: a retrospective observational study in four major adult tertiary-care hospitals

Michael F. Leahy,^{1,2,3} Axel Hofmann,^{4,5,6} Simon Towler,⁷ Kevin M. Trentino,⁸ Sally A. Burrows,¹ Stuart G. Swain,⁸ Jeffrey Hamdorf,^{9,10} Trudi Gallagher,^{11,12} Audrey Koay,¹¹ Gary C. Geelhoed,^{11,13} and Shannon L. Farmer^{9,14}



Factors impacting on the state of healthcare in SA

Factors impacting on the state of healthcare in SA

Budget constraints

- HCWs: Lack of available paid positions
- Migrants not included in Public hospital budgets → Inadequate funds in Public sector
- Increase in people using public sector healthcare, decrease in private sector healthcare
- Best international practice vs what SA can afford

Donors and Patients

- Healthy donors that can access donor clinics → Blood supply
- Access of patients requiring blood products → Blood demand

- Change of government → disruptive changes in Provincial (& hospital) management structures
- NHI rollout ... ? Funding / Format ?
- Civil unrests → limit access to clinics, BBK, hospitals and donor centers.
- Impact of regulatory changes

- Interest and exchange rates → increased cost of consumables, equipment and parts
- Access to critical consumables: Delay / non-delivery.
- Sanctions

Global Political and Economic Situation

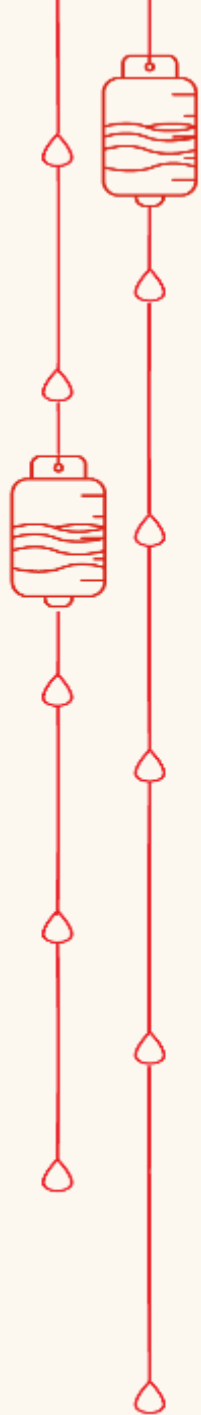
Resources
\$\$\$

Government/
Governance

Infrastructure
& Human
resources

State of
Healthcare
in South
Africa

- Alternatives to Eskom
- Potable water
- IT systems compatible with service providers: private and public health care infrastructure
- Skills shortage e.g. IT, labs, etc.
- Aging facilities.



Areas of concern – from a blood service perspective

- ❖ **Access to blood products** → Equitably
Distributive justice
- ❖ **Scarcity of donors in South Africa** → Maintaining donor health (iron)
Blood and blood products are scarce resources
- ❖ **Risks associated to transfusions** → Per blood product
Transfusion practices that lead to adverse events
Inherent transfusion risks / Negative clinical impacts
- ❖ **Optimizing patient outcomes** → PBM principles
Dose dependent negative outcomes
Patient / Public education (and rights)
- ❖ **Adherence to ethical principles and legal requirements**





Mind the gap: Patterns of red blood cell product usage in South Africa, 2014 - 2019

L Bolton,¹ BSc, PhD; K van den Berg,^{2,3} MB ChB, MMedSci (Transfus Med); R Swanevelder,² BCom, BSc Hons, MS; J R C Pulliam,¹ PhD

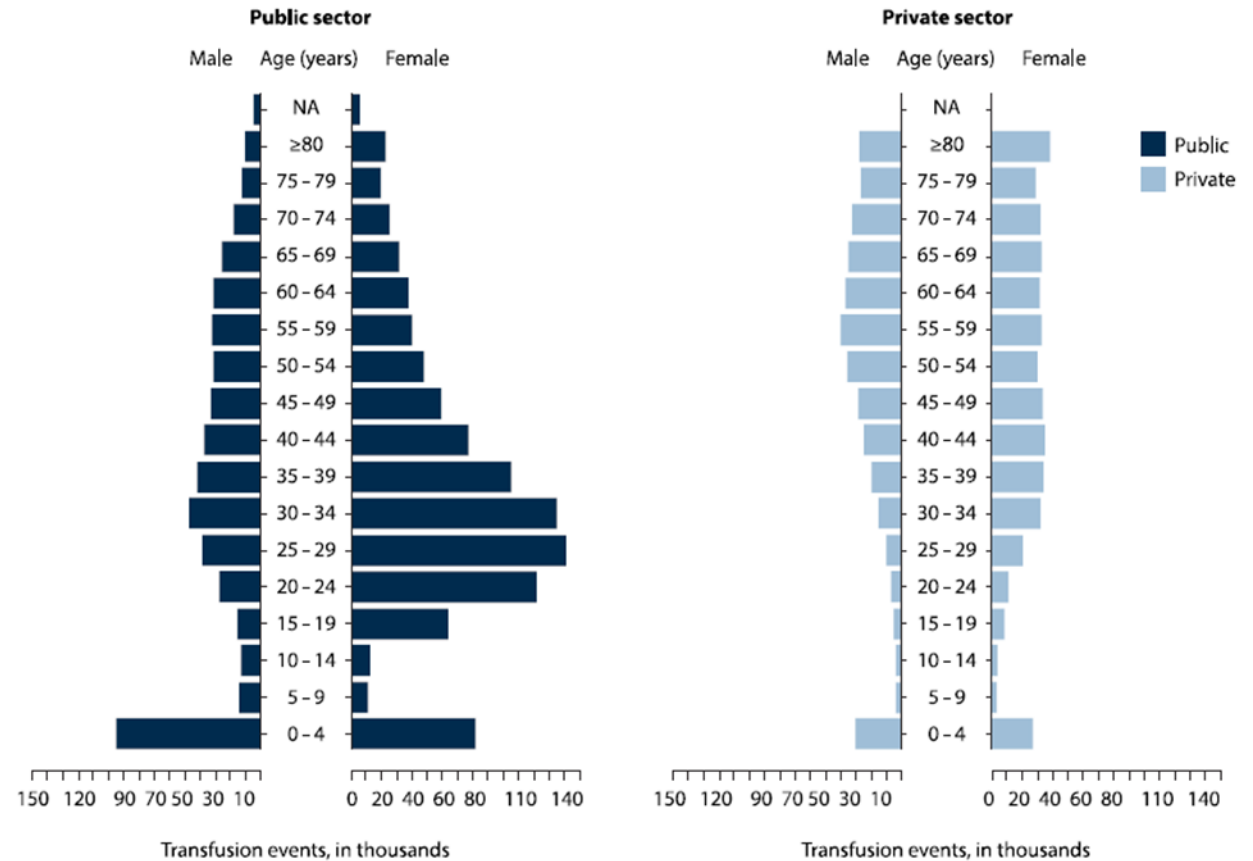


Fig. 1. Red blood cell transfusion events between 1 January 2014 and 31 March 2019, by gender and age in the public (N=1 553 159) and private (N=803 282) sectors. (NA = ages not available.)

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Table 3. Comparative RBC utilisation between the public and private healthcare sectors, 2014 - 2018*

Service date	Total units, <i>n</i> (%)	Public sector, <i>n</i> (%)	Private sector, <i>n</i> (%)	Public population estimates, [†] millions	Private population estimates, [†] millions	Per capita use in public sector [‡]	Per capita use in private sector [‡]
2014	762 719 (18.6)	464 769 (60.9)	279 279 (36.6)	39.09	8.02	11.89	34.81
2015	794 322 (19.3)	489 095 (61.6)	286 571 (36.1)	39.88	7.95	12.26	36.04
2016	779 393 (19)	470 546 (60.4)	292 397 (37.5)	40.37	7.93	11.66	36.88
2017	783 384 (19)	472 541 (60.3)	295 850 (37.8)	41.80	7.87	11.31	37.59
2018	779 571 (19)	469 948 (60.3)	294 834 (37.8)	42.66	7.72	11.02	38.21
2014 - 2018	3 899 389	2 366 899 (60.7)	1 448 931 (37.2)	203.78	39.49	11.62	36.69

*Utilisation figures and population estimates exclude Western Cape Province.

[†]Sources: references 8 and 20 - 23.

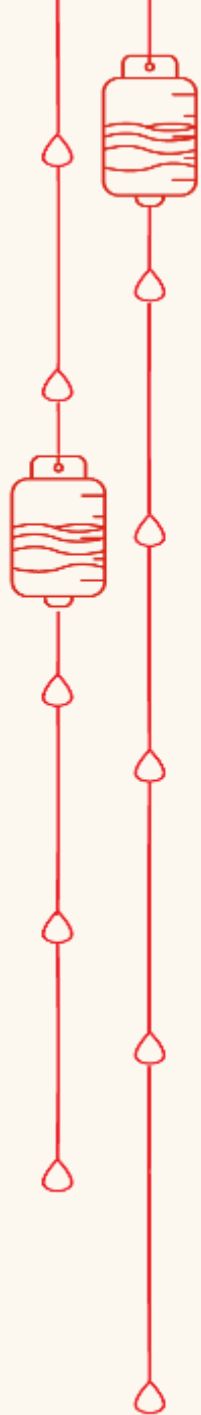
[‡]Number of units issued per 1 000 population.

Increased to > 12 and > 40 respectively, since.

The biggest concerns of all....

- Not realizing that your knowledge around transfusion medicine and patient blood management is lacking and/or outdated!
- Lack of oversight and governance at a national level.





What has been happening in South Africa?

What has been happening in South Africa?

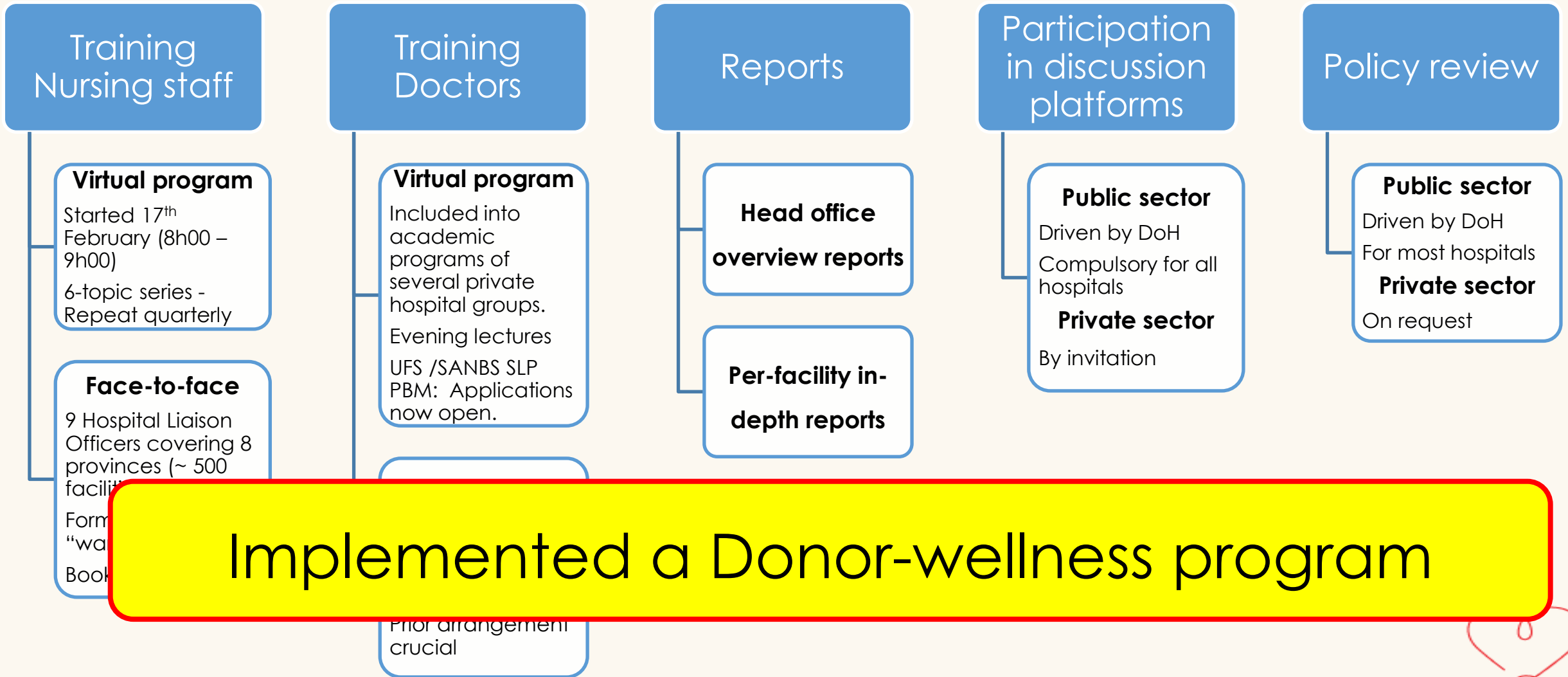
Both Blood services in SA implemented **iron replacement** therapy and **ferritin testing** on “at risk” donors – algorithmic approach.

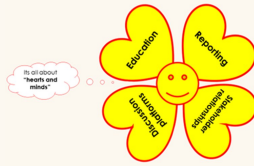
- ❖ By **end of 2019**, SANBS defines our “recipe for success” with regards to PBM implementation...

It's all about
“hearts and
minds”



What can SANBS offer?





Continued Professional Education initiatives

- ❖ **UFS & SANBS PBM short learning program** (online): Doctors, Nurses, Lab Professionals
- ❖ **Undergraduate programs:** UFS, Limpopo, WITS: Included in standing curricula
Nursing Colleges: Included in standing curricula of 7 colleges
- ❖ **Haem Deep Dive:** UCT driven online program with national and international footprint
- ❖ **Gastro ECHO:** Gastro Foundation driven online program with national and international footprint
- ❖ **SAMA:** Including PBM topics (and blood services) in their academic program
- ❖ **Private hospital groups** academic program inclusion
- ❖ **SANBS virtual / in-person training** of healthcare workers: ~ 10 000 per annum
Peer-reviewed & accredited
- ❖ **SANBS Virtual platform** for external HCWs to access material and obtain CPD points

Creating awareness through data sharing and discussion platforms

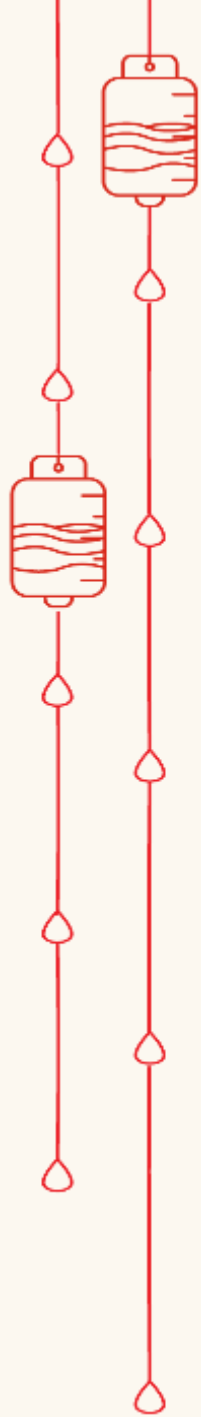


- ❖ **DOH:** Standardized reports to individual hospitals & Provincial structures
 - Standardized efforts to establish and maintain *effective* discussion platforms (with a **patient focus**, not only a product focus)
 - Hierarchical, risk-based approach to allocating SANBS support resources
- ❖ **Private:** Standardized reports to Head Offices and individual hospitals
 - Formalized discussion platforms at hospital level is still lacking in SA
 - Discussions with 5 major groups at National level taking place since 2023



Ensuring adequate “tools” and knowledge...

- ❖ Participate in Clinical Guidelines for SA – 2023 version included PBM
- ❖ Navigation to a safe transfusion (practical guide for nurses)
- ❖ Intern orientation program
- ❖ Emergency fridge booklet
- ❖ “Using SANBS statistics to monitor your PBM program” booklet
- ❖ Infographics / wraps (distributed electronically) on e.g. PBM, Informed consent, Blood Safety, etc.



Did we see any impact?

4 Year overview per province / Zone

Indicator		EC	FS	Gauteng	KZN	Limpopo	Mpum.	NC	NW								
Average Hb trigger (as per request forms)	2019	7.70	7.95	8.34	8.03	7.73	7.80	7.82	7.99								
	2021	7.57	7.80	8.35	8.01	7.65	7.81	7.58	7.99								
	2022	7.60	7.76	8.34	8.03	7.69	7.87	7.53	8.11								
	2023	7.62	7.67	8.41	8.04	7.59	7.94	7.63	8.05								
	2019	6.65	6.84	7.18	6.89	6.47	6.27	6.27	6.68								
	2021	6.75	6.81	7.28	7.00	6.66	6.76	6.34	6.90								
	2022	6.73	6.88	7.32	6.93	6.71	6.76	6.47	6.86								
	2023	6.82	6.96	7.37	6.97	6.78	6.93	6.49	6.92								
Average issues per request / Average issues per patient (> 3 Units RCCs)	2019	2.10	3.76	2.03	4.31	1.96	4.37	2.06	3.67	2.17	3.67	2.29	4.12	2.33	3.89	2.11	3.86
	2021	2.25	3.90	2.12	4.13	2.03	4.52	2.15	3.86	2.34	3.75	2.39	4.24	2.29	3.78	2.17	4.14
	2022	2.01	3.36	2.07	3.91	1.96	4.11	2.06	3.38	2.22	3.54	2.35	3.89	2.09	3.44	2.10	3.91
	2023	2.03	3.70	2.09	3.60	1.88	4.17	1.95	3.70	2.29	3.60	2.33	4.31	2.14	3.51	2.09	3.91
	2019	1.73	2.38	1.63	2.23	1.67	2.31	1.69	2.24	1.91	2.21	1.88	2.35	1.75	2.46	1.79	2.29
	2021	1.74	2.39	1.64	2.29	1.70	2.31	1.69	2.31	1.94	2.34	1.92	2.37	1.75	2.43	1.82	2.36
	2022	1.65	2.18	1.60	2.14	1.66	2.24	1.63	2.17	1.84	2.22	1.89	2.37	1.74	2.40	1.80	2.29
	2023	1.68	2.29	1.58	2.21	1.63	2.27	1.60	2.22	1.83	2.26	1.87	2.38	1.73	2.47	1.79	2.34
Private Hospitals								Public Hospitals									

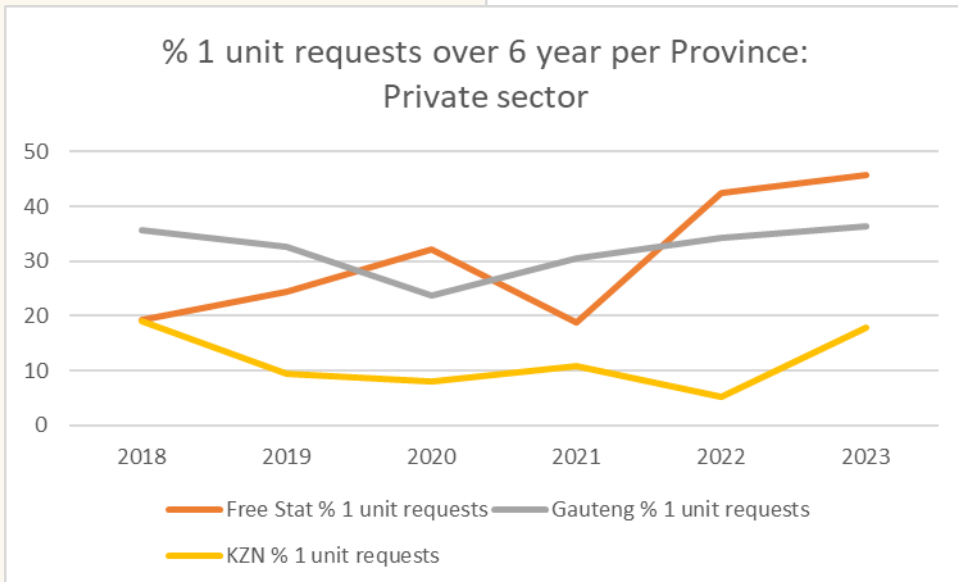
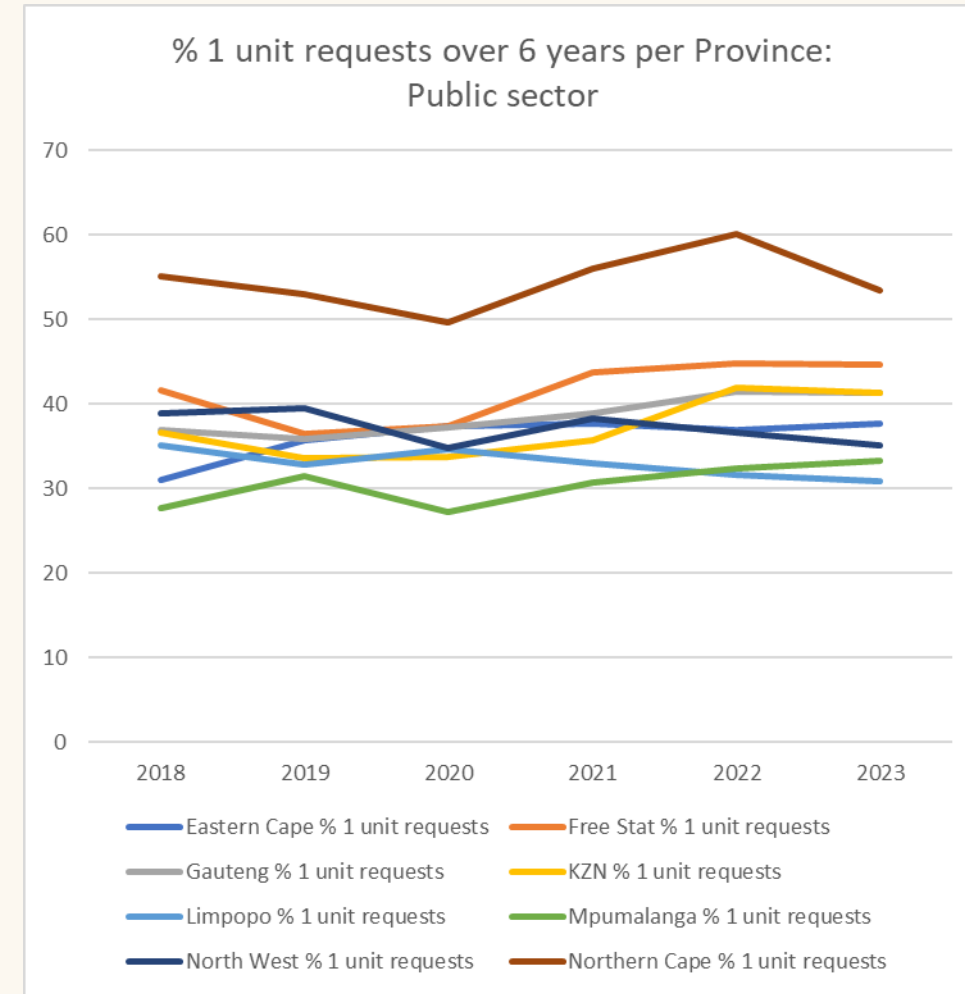
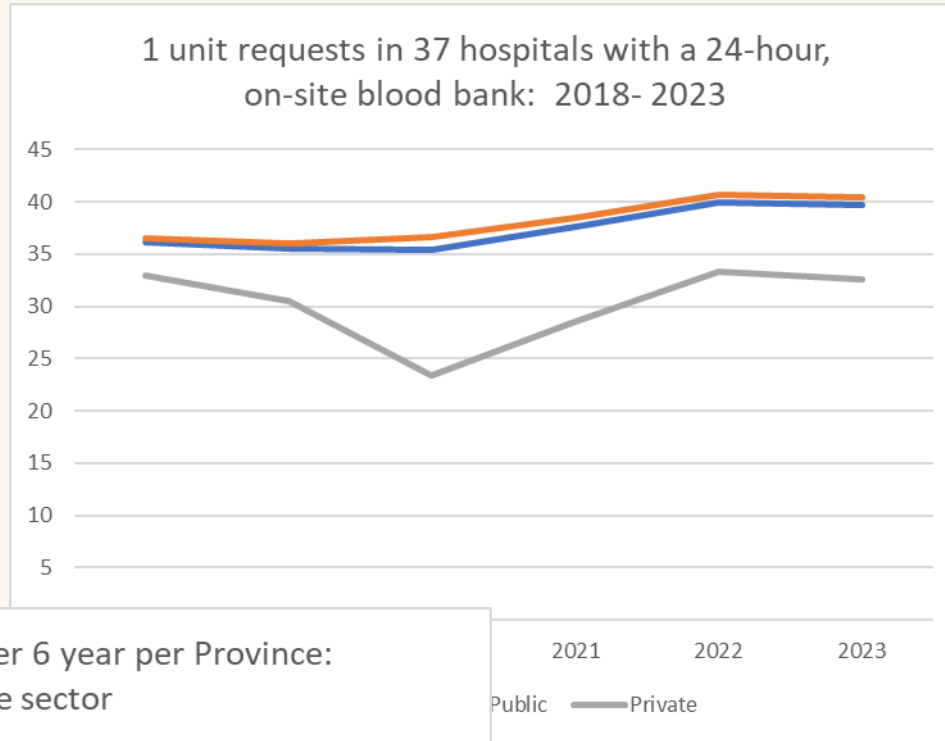
1-unit-at-a-time requests

(for hospitals with a 24 hour blood bank on the same premises)

- 37 hospitals “qualify”
- 7 Private sector
- 30 Public sector
- Monitor requests, not issues = ordering culture
- Surveys to determine factors hampering a 1-unit ordering culture:

Lack of enough doctors to re-evaluate need for subsequent units → order 2 units from the start.

Progress Jan to June: 2018 – 2023



- 4.4 % increase in 1-unit requests – **statistical significant improvement!**
- Discrepancy between private and public
- Discrepancy between provinces – that correlates with other SANBS observations and experiences e.g. training, discussion platforms, etc.

Conclusion

- It takes a lot of effort – from everybody!
- We have come a long way since February 2018 – 1st SA PBM interest group meeting in CT.
- South Africa is not a “copy and paste” from other countries – we have a unique healthcare environment & - challenges.
- Blood services moved from being the “drivers” of PBM in SA, to being the “support and guidance” structures in PBM - with clinicians slowly taking up their responsibility as PBM advocates.
- Blood services in South Africa has become key stakeholders in PBM in South Africa.



“The road to success is always under construction.”

Anonymous



Thank you



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